BULLETIN OF
THE GEORGIA ACADEMY OF SCIENCE

UNIVERSITY OF GEORGIA RECEIVED APR 14 1952

Volume X April, 1952 Number 1

OFFICERS

President, Dr. R. T. Lagemann
Vice-President, Dr. A. L. Cohen
Sec.-Treas., Dr. A. S. Edwards
Historian, Dr. W. B. Baker

EXECUTIVE COUNCIL

Ex-officio Members
The officers and past president

ELECTED MEMBERS
1951-52

Lucien Harris, Catherine Newton, W. F. Hamilton

SECTION MEMBERS

Robert J. Levit, Mary S. MacDougall, A. S. Furcron, J. E. Moore, H. T. Coggins

PROGRAM NUMBER

TWENTY-NINTH ANNUAL MEETING
OF
THE GEORGIA ACADEMY OF SCIENCE

Together with

THE ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
AND
THE GEORGIA SECTION OF THE AMERICAN CHEMICAL SOCIETY

AGNES SCOTT COLLEGE

APRIL 18 AND 19, 1952

Local arrangements headed by Dr. W. J. Frierson, Professor of Chemistry, Agnes Scott College

---

Georgia Junior Academy meetings: Oglethorpe University, April 18, 19.

Exhibits: Annual Science Fair, Faith Hall, Oglethorpe University, open Friday, 9 A. M. to 10 P. M., Saturday, 9 A. M. to 12:30 P. M.

Meeting: Oglethorpe University Auditorium, Saturday, 10 A. M. to 12:30 P. M. Awards and Scholarships to exhibitors. Reading of winning papers in the Science Talent Search.

BRING THIS PROGRAM WITH YOU TO THE MEETINGS

PROGRAM

THURSDAY, APRIL 17, 1952

6:15 P.M. Dinner for the Executive Council, officers of other organizations meeting jointly with the Academy. Guests of Agnes Scott College. Letita Pate Evans Dining Hall.

FRIDAY, APRIL 18, 1952

Morning

8:30- 9:00 Registration and Banquet Reservations, Campbell Science Hall, Room 216.

9:00-12:00 Section Meetings.

12:00- 1:30 Lunch, Letita Pate Evans Dining Hall and Restaurants in Decatur (Information at Registration Desk)

Afternoon

1:30- 2:30 Business Meeting of the Academy, Campbell Science Hall, Room 308.

2:30- 4:30 Section Meetings.

4:30- 5:00 "Organization of a Conservation Program," Speaker, Dr. Richard Weaver, Conservation Section, National Association of Biology Teachers.

5:15- 6:00 Tea for members and guests of Societies meeting at Agnes Scott, home of President Wallace M. Alston.

Evening

6:15 Banquet, Welcome by President Alston, presentation of officers and guests. Letita Pate Evans Dining Hall.

8:15 Principal Address: "The Evolution of Photosynthesis," Dr. C. B. van Niel, Hopkins Marine Station of Stanford University, Pacific Grove, California.

SATURDAY, APRIL 19, 1952

Morning

9:00-12:00 Section Meetings.

10:30-12:00 Field trip to Stone Mountain, sponsored by Association of Southeastern Biologists. Details at registration desk.

Commercial Exhibits: Room 202, Campbell Science Hall, Friday and Saturday.

ROOMS FOR SECTION MEETINGS

Campbell Science Hall

Biology and Zoology	Room 207
Botany	Room 214
Chemistry	Room 308
Chemistry	Room 310
Earth Sciences	Room 408
Physics and related fields	Room 407

Buttrick Hall

Psychology, Biology and Medicine	Room 103
Philosophy of Science	Room 203

CHEMISTRY SECTION

Chairmen { H. T. COGGIN (Ga. Academy)
ROBERT S. INGOLLS (Ga. Section, A.C.S.)

FRIDAY—9:30 A. M.

The Detection of Radio-Contaminants by means of Paper Chromatography and application to Biological Studies with Copper

W. JOE FRIERSON, Agnes Scott College

Radioactive tracers have been applied to paper chromatographic separations of inorganic ions. This method has been found to be of special value for the detection of radio-contaminants. The contaminants present in radioactive samples of copper have been investigated and such contaminants have been found to definitely affect the results obtained in Biological studies.

20 Minutes. **Slides.**

A Geochemical Study of Georgia Waters

ROBERT S. INGOLLS, Engineering Experiment Station, Georgia Institute of Technology

Because inorganic compounds of nitrogen have frequently been considered as indicating pollution of biological origin, we carefully noted the presence of large amounts of inorganic nitrogen in ground and surface waters in many Georgia samples which we analyzed. Some of these samples were taken from surface and ground waters in the virgin forest region of North Georgia near Clayton. Some granite rock was finely ground and then leached in boiling water for several days. The water showed that the rock contained ammonia in at least a few parts per million on a dry weight basis. The hypothesis was considered that the trace amounts of soluble constituents were responsible for the rapid weathering of granite rock in Georgia. A research study indicates that the nitrogen is leached into the waters of Georgia in appreciable quantities because the rock weathers so fast, rather than that the rock weathers rapidly because of the trace amount of soluble subsances. Tests with freshly deposited granite from a very recent volcanic eruption indicated that ammonia is laid down with granite rock.

20 Minutes.

Reaction of Some Primary Thioamides with Copper Powder

JOHN A BROWN and JAMES A. STANFIELD, Georgia Institute of Technology

Thioacetamide, Thiopropionamide, and thiobutyramide have been heated with five times their molar quantities of copper powder

under an atmosphere of nitrogen. It was found that loss of hydrogen sulfide resulted, with the production of the corresponding nitrile, instead of the condensation to an olefinic compound which might be expected by comparison with the analogous treatment of thioaldehydes and thioketones. Side products were hydrogen sulfide, ammonia, copper sulfide, water, end, in the case of thioacetamide, a small amount of diacetonitrile.

20 Minutes. 3¼" x 4" Slides.

Polarography of p-Chlorobenzophenone and Xanthone

R. A. DAY, JR. and R. E. BIGGERS, Emory University

Previous studies on the polarography of aromatic ketones have indicated that the tendency of a ketone to reduce in two steps, i.e., produce double waves, in alkaline solutions is a function of the aromatic groups attached to the carbonyl. If the aromatic group tends to promote free radical stability, less tendency o form double waves has been found. It is assumed that a metal ketyl is the intermediate produced during reduction in alkaline solutions. The stronger the tendency of this ketyl to dimerize, the stronger is the tendency to produce double waves.

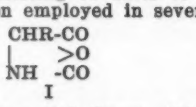
The p-chlorophenyl group promotes free radical stability less than the phenyl group; the xanthyl group has a greater stabilizing effect than two phenyl groups. The results of a study of the polarography of p-chlorobenzophenone and xanthone show that the former compounds forms double waves more readily, and the latter less readily than the benzophenone. The effects of these two groups is in qualitative agreement with effects previously noted for the alpha-naphthyl, phenyl, benzanthryl, and 9-fluoryl groups. The studies have been made in ethanol solutions over a wide pH range and half-wave potentials are reported at each pH.

20 Minutes. Slide Projector.

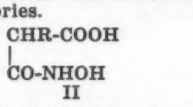
Recent Advances in the Synthesis of Higher Polypeptides

CHARLES M. BUESS, The University of Georgia, Athens, Georgia

The higher polypeptides (CHR-CO-NH)x have attracted wide attention because of their similarity to natural proteins. The Leuchs polymerization (1906) involving the use of azasuccinic anhydrides (1) is an attractive method for the preparation of polypeptides consisting of units of one amino acid. This reaction has recently been employed in several laboratories.



I



II

Hurd, Buess and Bauer (1951) studied the Lossen rearrangement of alpha-carboxy hydroxamic acids (II) and found that polypeptides were formed directly. This reaction has also been applied to the preparation of new types of polypeptides (submitted for publication).

The physical properties of the polypeptides are dependent on the method of preparation and grossly dependent on the amino acid unit present. The physical form may also be changed by precipitation from various solvents, as formic acid or pyridine. Infrared analysis and other physical methods have been employed with some success in the determination of the fine structure.

One of the obstacles in attempts at synthetic duplication of pro-

teins is the question of arrangement of the various amino acid units. Polypeptides containing two and more amino acid units have been prepared by employing mixtures of I or II, but no evidence has been reported to indicate that combination occurs in any but random fashion.

20 Minutes. Slide Projector.

The Relative Acidity of Water, Methanol and a Number of Other Weak Acids in *iso*-Propanol Solution

JACK HINE and MILDRED HINE, Georgia Institutue of Technology

By using *p*-nitrodiphenylamine as an indicator, the relative acidity of water and a number of alcohols and amides has been determined in *iso*-propanol solutino. Other data indicating that, contrary to common belief, methanol is a stronger acid than water is discussed. The effect of structure on the acidity of the compounds is considered. The following data were obtained.

$$\text{Where } K = \frac{[A^-]}{[\text{i-PrO}^-]\ [HA]}$$

HA	K	HA	K
Water	1.4	2-Ethoxyethanol	11
Methanol	4.0	2-Methoxyethanol	8
Ethanol	1.0	2-Phenoxyethanol	11
n-Propanol	0.5	Trimethylene glycol	12
iso-Propanol	0.076	Methyl lactate	210
n-Butanol	0.6	1-Methoxy-2-Propanol	1.8
iso-Butanol	0.5	Ethanolamine	7
sec-Butanol	<0.3	Formamide	13
tert-Butanol	<0.3	Formanilide	560
Allyl alcohol	2.8	Benzanilide	60
Benzyl alcohol	3.8	Benzamide	<0.3
Benzhydrol	2.1	Phenoxyacetamide	13
Ethylene glycol	43	*p*-Nitrobenzamidee	290
Glycerol	174	Acetanilide	5
		Phenylacetanilide	10

These values are thought to be accurate to within about 20%, except for those less than 2, for which the accuracy is probably somewhat less.

20 Minutes.

FRIDAY 2:30 P. M.

A Proposed Treatment for Osteomyelitis

WILLAM JOHN RUSSELL, Marion Military Institute, Marion, Alabama

Osteomyelitis is infection, degeneration and necrosis of the bone marrow and bone. It is suggested that biochemical deficiency of the marrow is more fundamentally and basically important than the staphylococcus hemolytic organisms. A treatment is proposed which consists of an orally administered group of medicinals including soluble iron, a microdosage of copper sulfate, thiamin,

calcium pantothenate, along with sugar and lemonade. The citrus fruit is intended to supply citrates to insure solubility and assimilation of the iron and cooper so as to strengthen the bone marrow and red cells. The pantothenate vitamin has been reported to prevent lesions of the marrow in experimental animals. It seems also to aid in sugar metabolism.

Because osteomyelitis is a frequent complication of wartime casualties, it is hoped that chemical therapeutics may speed recovery, substituting in larger part for excessive surgical and orthopedic treatments.

20 Minutes.

The Preparation of Some Organo-Selenium Compounds

G. E. PHILBROOK, Chemistry Department, University of Georgia

The objective of this work was to prepare the selenium analogue of sulfanilamide.

Attempts to introduce the selenonic acid radical into acetanilide directly failed.

The preparation of the compound was attacked by an indirect introduction of the selenonic acid group starting from p-nitroaniline. This last group was diazotized and the diazonium group was replaced by the selenocyanate radical. Reduction of the compound was followed by peroxide oxidation to the corresponding diselenide. The diselenide was acetylated and oxidized in two steps to the selenonic acid, which was isolated as the sodium salt. Attempts to convert the salt to the acid chloride failed. Treatment of the sodium or barium salt with small quantities of mineral acid lead to the hydrolysis of the acetyl group followed by oxidative degradation of the compound. This same behaviour has been reported for the meta isomer.

20 Minutes. Blackboard.

Lacquer Color Filters for Qualitative Flame Tests

JOHN A. BROWN, Georgia Institute of Technology

Transparent, colored, lacquer films on glass may be used as color filters in the flame-test detection of barium ion in the presence of strontium ion; strontium ion in the presence of barium ion; sodium ion in the presence of patassium ion; and potassium ion in the presence of sodium ion. These filters are made by coloring standard-type, quick drying, nitrocelloluse solutions with organic dyes; and are painted onto a glass plate with a brush or with an eye-dropper.

This paper describes the preparation of three such lacquers, and reports on their successful use in an elementary course in Qualitative Analysis.

20 Minutes.

The Catalytc Hydrogenation of Quinoline at Elevated Pressures

JAMES A. STANFIELD and EUGENE F. COX,
Georgia Institute of Technology

(Introduced by H. T. Coggin)

A kinetic study has been made of the hydrogenation of quinoline and certain methyl-substituted quinolines at pressures of 1000 p.s.i. to 2000 p.s.i. and at temperatures from 20° 70°C. The catalyst was Adams' platinum oxide and a solvent of glacial acetic acid was used. The reaction has been found to follow first order kinetics with respect to hydrogen pressure, to be zero order with respect to hydrogen acceptor, and to be directly proportional to the amount of catalyst used. The hydrogenation process with the formation of the 1,2,3,4,-tetrahydro derivative in the cases of quinoline and the 6, the 7, and the 8-methyl quinolines. In the cases of the 2, the 3, and the 4-methyl quinolines, both the 1,2,3,4- and the 5,6,7,8-tetrahydro insomers were formed simultaneously. Energies of activation for the reduction of each of the ring systems has also been determined.

20 Minutes. Standard Lantern Slides.

EARTH SCIENCE SECTION

FRIDAY, APRIL 18, 1952

Campbell Science Hall, 408

Chairman, M. T. Thomson, U. S. Geological Survey

MORNING SESSION 9:00-12:00

Geomagnetic Profiles Along Savannah Valley

H. W. STRALEY, III, Georgia Institute of Technology

Under cooperative sponsorship, magnetic profiles were prepared for both sides of the Savannah valley. Except for finding new Carolina bays and limiting the northwestward extension of the Beaufort basin, positive results are lacking. No continuation of gradient changes of basement complex surface was noted, probably because the feature is offshore at Savannah. Anomalies decrease, toward the Piedmont, at Augusta.

10 Minutes. 3 x 4 slides.

Cenozoic Fossils in a Conglomerate Interstratified with Paleozoic Rocks

H. E. COFER, Emory University

(Introduced by J. G. Lester)

Three beds of coarse limestone conglomerate and their faunal assemblage are described. The beds are interstratified with lime-

stone of Cambro-Ordovician age. The mechanisms of the formation and the position of the conglomerate and the incorporation of organisms are discussed.

5 Minutes 3″ x 4″ Slides.

Clays of Georgia: Progress and Plans for Work at Georgia Institute of Technology, Engineering Experiment Station

D. W. Gates, Georgia Institute of Techology, Engineering Experiment Station

(Introduced by H. W. Straley, III)

This project hopes to characterize samples, by several methods of examination, and to relate the characteristics of the processed clay both to the raw material and to the effect of the process. Fundamental information of Georgia Clays will be the primary interest. Some of the methods used for examination are: X-Ray Diffraction, Electron and Optical Microscopy, Chemical Analysis, Differential Thermal Analysis, and other physical and chemical tests.

10 Minutes. 3 x 4 Slides.

A Possible Origin of an Eocene Stream Channel in Baldwin County

GENE L. SCHEPIS, Emory University

(Introduced by J. G. Lester)

A stream channel of probable Eocene age is located in a road cut 1 mile east of Black Springs Church on Georgia highway 22 in Baldwin County. The channel lies unconformably on the Tuscaloosa formation and contains stratified sediments of quartz pebbles and grains which are cemented slightly by kaolin. Kaolin balls of various sizes are scattered throughout the channel. At its greatest extents the channel is 11 feet deep and 78 feet wide. The purpose of this paper is to determine the environment in which this channel originated.

10 Minutes. 3 x 4 Slides.

On Chertification in the Ft. Payne

VERNON J. HURST, Emory University

The Mississippian Ft. Payne formation in Georgia contains abundant chert. Where chert constitutes the bulk of the formation, it occurs mainly in stratiform layers; in the areas of the Ft. Payne where shale and limestone are present, the chert occurs in nodules and scattered replacements. The stratigraphic position of the chert beds in relation to the cherty shales and limestones in the Ft. Payne appears to be variable. Still the chert beds do not occur in the immediately overlying or underlying formations,

even where lithologies are similar. It appears, therefore, that origin by replacement does not adequately account for the presence of chert in Ft. Payne.

Samples have been systematically collected from three sections of the Ft. Payne, one on U. S. Highway 27 near Gore, Georgia, another in Houston Valley, east Nickajack Gap Quadrangle, northwest Georgia, and a third in Parker's Gap, Tennessee. Petrographic evidence bearing on the origin of the chert is presented.

10 Minutes. 3 x 4 Slides.

The Utilization of Granite and Migmatite In Agriculture

A. T. NAVARRE, Georgia Institute of Technology

The use of granite and migmatite for agricultural purposes has generally been overlooked. Migmatitic granites contain certain elements which are necessary in the nutrition of plants and because of their unusual compositions resulting from hybrid origin are very well suited for agricultural use. The granite meal of the Davison Quarry at Lithonia has been tested on grasslands and citrus groves in Palm Beach County, Florida with remarkable results. Several agricultural experiment stations are testing these granitic dusts for farm use. The material does not increase the pH of the soil as do many fertilizers unless it is counterbalanced with a proper filler. The uses of granite dust will be discussed in the paper to be presented.

10 Minutes. Opaque Projector.

Heavy Mineral Prospecting, Cohutta Mountains, Georgia

E. M. BARGE and R. G. PRUITT, JR., Emory University

(Introduced by J. G. Lester)

The headwaters of the Conasauga River in a remote section of the Cohutta Mountains (Ocoee Series) were panned in search of a reported occurrence of cassiterite. Laboratory analysis of the concentrates reveals a heavy mineral suite of the Ocoee Series. Minerals found are identified and tabulated, and comments made on observed mineralization in the Ocoee.

8 Minutes.

Sedimentation and Paleoecology of the Ripley Formation in Stewart and Chattahoochee Counties

E. LOUIS VEST, Emory University

(Introduced by J. G. Lester)

Studies were made of the processes of sedimentation and of the relationship of the fauna to the sediments in the Ripley formation of Stewart and Chattahoochee Counties. Various pertographic methods were applied to the sedimentary materials in an attempt

to reconstruct the environment of deposition. The faunal assemblage was studied in detail to determine possible relationships between environment and the degree of specilization.

15 Minutes. 3 x 4 Slides.

Inclusions In Some Granites of the Piedmont of Georgia

ELDON J. PARIZEK, University of Georgia

Numerous inclusions can be observed in and near the contact zone of granites in the vinicity of Athens, Georgia. To date, field and laboratory studies of the inclusions has been inconclusive, but it is considered that both sedimentary xenoliths and autoliths are present. Minerology and contact relations of individual masses support this belief.

Planar structure of the granites, with aligned inclusions and prismatic minerals, strikes slightly northeast-southwest. This strike closely parallels the axial trend of minor southwest plunging folds in the region, detected in the partially intruded and highly folded remnants of country rock. In several regions numerous inclusions are strewn out normal to the general trend in a roughly accurate pattern. A tentative hypothesis is offered to explain the relation of inclusion pattern to the folds.

15 Minutes. 2 x 2 Slides.

Iron, Lumpkin County, Georgia

W. R. BROWN and C. E. ROWLANDS, JR.

(Introduced by H. W. Straley, III)

As early as the 1880s, iron was known from the gold belt of Lumpkin County, Georgia. A magnetic reconaissance in 1951 discovered a new body, extended two already known, and connected two that had bee considered separate. Structural information of significance was also obtained.

10 Minutes.

Testing a Collapse Origin Hypothesis for Providence Canyon

E. M. BARGE and R. G. PRUITT, JR., Emory University

(Introduced by J. G. Lester)

Question: How can trees of apparent old age be growing upright in the bottom of a canyon which itself is of modern origin? Using a tree auger the age of the trees was determined by annular growth rings. A search was made for criteria which might support a collapse origin. An outline map of the canyons shows the location of each tree sampled. Photographs illustrate the area and methods used.

8 Minutes. 2 x 2 Color Slides.

Provenance Study of the Heavy Minerals in the Streams of the Gold Belt Portions of Lumpkin and White Counties, Georgia

HERBERT YOHO, Dept. of Geol. & Phys. Sciences, Univ. of Florida

(Introduced by A. S. Furcron)

It has been known since the early days of the Dahlonega gold mining operations that an abundance of mineral grains with specific-gravity greater than 2.95 existed in the stream sands of the "Gold Belt," a zone averaging about six miles wide and extending NE-SW with Dahlonega, in Lumpkin County, about the middle of the zone.

Samples were collected from the stream sands of the area and the heavy minerals were concentrated by panning. Channel samples of the saprolites were taken and pan concentrated. Unweathered rock samples were crushed and pulverized, and the pulverized material was also panned to obtain a heavy concentrate. All samples were screened to obtain the 1/8-1/16 mm. grade size which were treated with a magnetic separator. Screen tests were made on many of the stream sand concentrates. Slides were made (balsam mounts) of the highly, moderately, and weakly magnetic fractions. The non-magnetic fractions were further separated with tetrabromethane and samples of the heavy fractions were mounted.

The most abundant heavy mineral in the area is ilmenite, literally found everywhere. Other very abundant ones in the stream sands are zircon, rutile, and epidote. Others less abundant but commonly found, include magnetite, staurolite, hornblende, garnet, kyanite, sillimanite, touramaline, hematite, tixanites, pyrite, leucoxene, biotite & muscovite.

15 Minutes. 2 x 2 Slides.

Some Sedimentary Features of a Settling Pond

D. CRAIG WRIGHT, Emory University

(Introduced by J. G. Lester)

A study of the settling pond at the New River Barite and Ochre Co. in Cartersville, Georgia reveals several interesting sedimentary phenomena. Bedding, cross-lamination, intraformational conglomeartes, and cracks, peeled laminae, worm burrows, and oolites are found in addition to such structuraal features as tension "jointing" and slump faulting.

A statistical analysis of the sedimentary process involved is presented in order to shed light upon the probable origin of these structures.

10 Minutes. 2 x 2 Slides.

PROGRAM OF THE

THIRTEENTH ANNUAL MEETING

of the

ASSOCIATION OF SOUTHEASTERN BIOLOGISTS

A Joint Meeting With

THE SOUTHEASTERN SECTION OF
THE BOTANICAL SOCIETY OF AMERICA
THE SOUTHERN APPALACHIAN BOTANICAL CLUB

And

THE BIOLOGY SECTION OF THE GEORGIA
ACADEMY OF SCIENCE

April 18-19, 1952

AGNES SCOTT COLLEGE

DECATUR, GEORGIA

PROGRAM

Thursday, April 17th

6:15-11:00 p.m.	Meeting of the Executive Committee, Letitia Pate Evans Dining Hall.
8:00-10:00 p.m.	Open house at Bradley Observatory. Dr. Wm. A. Calder in charge.

Friday, April 18th

7:30- 8:00 a.m.	Registration, Campbell Science Hall.
8:00- 9:00 a.m.	Business Meeting, Association of Southeastern Biologists, Room 207, Campbell Science Hall.
9:00-12:00 m.	Presentation of Papers. Biological Session.
12:00- 1:15 p.m.	Lunch.
1:15- 1:30 p.m.	Business meeting of the Southeastern Section of the Botanical Society of America, Room 214, Campbell Science Hall.
1:30- 4:30 p.m.	Presentation of Papers. Botanical Session, Room 214, Campbell Science Hall. Zoological Session, Room 207, Campbell Science Hall.
4:30- 4.45 p.m.	Meeting of the Executive Committee, Room 216, Campbell Science Hall.
4:30- 5:00 p.m.	Southeastern Planning Meeting for Conservation Project of National Association of Biology Teachers. Dr. Richard Weaver, project leader, Room 207, Campbell Science Hall.
4:30- 5:30 p.m.	Tea for Members and Guests at the home of President Wallace M. Alston.
6:15- 8:00 p.m.	Annual Dinner, Toastmaster, Dr. Mary Stuart MacDougall. Address of Welcome, President W. M. Alston. Presentation of Guests and Officers. Presentation of Awards.
8:15- 9:15 p.m.	Address: "The Evolution of Photosynthesis," by Dr. C. B. van Niel, Hopkins Marine Station of Stanford University.

Saturday, April 19th

8:30- 9:00 a.m.	Business Meeting, Association of Southeastern Biologists, Room 207, Campbell Science Hall.
9:00-12:00 m.	Presentation of Papers. Biological Session.
9:00-10:20 a.m.	Section I. Room 214, Campbell Science Hall.
9:00-12:00 m.	Section II. Room 207, Campbell Science Hall.
10:30- a.m.	Botany Field Trip to Stone Mountain and Mt. Arabia..

BIOLOGICAL SESSION

FRIDAY, APRIL 18, *Room 207, Campbell Science Hall*

8:00- 9:00 a.m. Business Meeting, Association of Southeastern Biologists, Dr. H. P. Sturdivant, Vice-president, presiding.

9:00-12 m. Presentation of Papers, Dr. H. P. Sturdivant, presiding.

1. The Chromosomes of *Spirorchis magnitestis* Byrd (Digenea: Spirochidea). (5 min.), ARTHUR W. JONES and THOMAS C. MAYER, University of Tennessee.
2. The Caribe-Cuna Moon-child and its Heredity. (12 min.), CLYDE E. KEELER, Georgia State College for Women.
3. Broader Horizons for the Biologist in Micro-climatic Research. (12 min.), ROBERT B. PLATT, Emory University.
4. A Tobacco Virus Causing Necrosis. (6 min.), FREDERICK A. WOLF, Duke University.
5. Occurrences of Antimicrobial Substances in Chlorophyllose Plants Growing in Florida. (12 min.), GRACE C. MADSEN and ANNE L. PATES, Florida State University.
6. The Effect of Various Enzymes on Nuclei Isolated From Rat Liver. (12 min.), NORMAN G. ANDERSON, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
7. Glutamic Acid in Relation to Oxygen Utilization by the Brain. (12 min.), ANITA DURAND STONE and JOHN W. FOSTER, School of Veterinary Medicine, University of Georgia.
8. Oxidation Reduction Potential of Mycobacteria. (10 min.), W. B. REDMOND, Tuberculosis Research Laboratory, Veterans Administration Hospital, Chamblee, Georgia.
9. Relation of the Sex Chromosome to DDT Resistance in the German Cockroach. (10 min.), D. G. COCHRAN, J. M. GRAYSON and MAX LEVITAN, Virginia Polytechnic Institute.
10. Some Effects of Maleic Hydrazide on the Growth of Avena Seedlings. (12 min.), SIDNEY P. JOHNSON, University of North Carolina.
11. Chemotherapsy of Experimental Leptospirosis with Chloromycetin and Penicillin G. (10 min.), MARY C. DUNN and PAUL E. THOMPSON, University of Georgia and Parke, Davis and Company.
12. Influence of Cortisone on the Natural Course of Malaria in Pigeons. (12 min.), W. B. Redmond, Medical Research Laboratory, Lawson Veterans Administration Hospital.
13. A Comparison of Two Stem Galls on Solidago Induced by the Larvae of Two Different Dipterous Insects. (12 min.), EDWIN G. BECK, University of Georgia.
14. A Comparison of Two Stem Galls on Solidago Induced by the Larvae of Two Different Lepidopterous Insects. (12 min.), EDWIN G. BECK, University of Georgia.
15. Leonardo DaVinci—Fifteenth Century Biologists. (10 min.), C. FRANCIS BYERS, University of Florida.

BOTANICAL SESSION

FRIDAY, APRIL 18, *Room 214, Campbell Science Hall.*

1:15- 1:30 p.m. Business Meeting, Southeastern Section, Botanical Society of America; Dr. Walter S. Flory, Chairman, presiding.

1:30- 4:30 p.m. Presentation of Papers. Dr. Walter S. Flory, presiding.

16. Some Observations on Hard Seed in *Lupinus angustifolius.* (10 min.), ROBERT E. BURNS, Bureau of Plant Industry, Experiment, Georgia.

17. The Comparative Anatomy of the Genus Diapensia. (12 min.), HIDEN T. COX, Virginia Polytechnic Institute.

18. An Undescribed Erythronium in Middle Georgia. (10 min.), ROLAND M. HARPER, University, Alabama.

19. The Genus Xyris in North Carolina and Adjacent Areas. (10 min.), H. L. BLOMQUIST, Duke University.

20. The Genus Tovara. (10 min.), AARON J. SHARP, University of Tennessee.

21. Monocotyledons in Liberia. (12 min.), J. T. BALDWIN, JR., College of William and Mary.

22. The Role of Adventitious Roots in Survival of Cypress. (10 min.), HERMAN KURZ and KENNETH WAGNER, Florida State University.

23. Analysis of a Virgin Stand of Cypress. (10 min.), HERMAN KURZ and KENNETH WAGNER, Florida State University.

24. Bryophytes in a Florida Beech-Magnolia Climax Forest. (10 min.), RUTH S. BREEN and MARY LIVINGSTON, Florida State University.

25. Problems in the Reproduction of *Pleurochaete squarrosa.* (5 min.), ELSIE QUARTERMAN, Vanderbilt University.

26. A New Member of the Phacotaceae. (12 min.), HAROLD C. BOLD and RICHARD C. STARR, Vanderbilt University and Indiana University.

27. The Isolation and Rapid Culture of Soil Algae. (12 min.), FRANK R. BURLESON, Virginia Polytechnic Institute.

28. Observations on a New Chlorophycean Genus Belonging to the Family Chlorococcaceae. (10 min.), RICHARD C. STARR, Indiana University.

29. A Unique Motile Green Alga—Amphibian Relationship. (5 min.), ROBERT B. PLATT and HAROLD STEELE, Emory University.

30. Growth Rate Determinations for Tree Lichens. (8 min.), ROBERT B. PLATT and FRED P. AMSLER, Emory University.

ZOOLOGICAL SESSION

FRIDAY, APRIL 18, *Room 207, Campbell Science Hall*

1:30- 4:30 p.m. Presentation of Papers. Dr. Margaret Hess, President-Elect, Association of Southeastern Biologists, presiding.

31. Observations on Gonadotropin in the Blood of the Mouse. (12 min.), FRANCES N. GAMBLE and MEREDITH N. RUNNER, Oak Ridge National Laboratory and Roscoe B. Jackson Memorial Laboratory.

32. An Experiment Approach to the Formation of Mammalian Ova. (12 min.), RUTH M. JONES, Winthrop College.

33. Total and Acid-soluble Fractions of Phosphorus in Various Tissues of Chick Embryos. (10 min.), MARY H. PARTRIDGE and MARY E. SHONTZ, Emory University.

34. Iodine Distribution in Chick Embryos. (10 min.), ERNEST L. HUNT and PRENTIS B. Huff, Oak Ridge National Laboratory and Emory University.

35. An Experimental Study of Germinal Localization in Ilyanassa, with Special Reference to the Influence of the Polar Lobe in Cleverage and Later Development. (12 min.), A. C. CLEMENT, Emory University.

36. The Southern Pipefish, *Syngnathus scovelli* (Evermann and Kendall), on the Gulf Coast of Florida. (10 min.), GEORGE K. REID, JR., University of Florida.

37. Preliminary Report on the Crayfishes of Georgia. (10 min.), HORTON H. HOBBS, JR., University of Virginia.

38. Cytological Studies of the Germ Cell Cycle in the Trematode Family Bucephalidae. (10 min.), HONORICO CIORDIA, University of Tennessee.

39. *Paranoplocephala threlkeldi*, a New Species of Tapeworm (Cestoda: Anoplocephalidae) from *Lagidium peruanum*. (12 min.), BERTHA E. PARRA, Virginia Polytechnic Institute.

40. Observations on the Helminth Parasites of the Pied-billed Grebe, *Podilymbus podiceps* (Linn.), from Georgia. (8 min.), OSCAR S. NEYLANS, JR., University of Georgia.

41. Observation of the Hatchability of Ochetosomatid Trematode Eggs. (10 min.), ELON E. BYRD, University of Georgia.

42. Observations on the Development of *Dirofilaria immitis* in Certain Insects. (10 min.), RICHARD E. BRADLEY, University of Georgia.

43. Monogenetic Trematodes of Westhampton Lake Fishes . III. Comparative Morphology of the Species Encountered with a Discussion of Host Specificity. (12 min.), WM. J. HARGIS, JR., Florida State University and University of Richmond.

44. Host Specificity of and Immunological Reactions against *Trypanosoma diemyctyli* in Amphibia. (12 min.), JAMES H. BARROW, BETTY J. VAUGHN and ANNE M. SALYERDS, Huntington College.

45. A World Map of Saturation Deficit, Niche Variety and the Distribution of the Onycophora. (10 min.), HOWARD T. ODUM, University of Florida.

BIOLOGICAL SESSION

SATURDAY, APRIL 19, *Campbell Science Hall*

8:30- 9:00 a.m. Business Meeting, Association of Southeastern Biologists; Dr. H. P. Sturdivant, Vice-president, presiding.

9:00-10:20 a.m. Section I. Presentation of Papers. Dr. R. B. Platt, Secretary, Southeastern Section, Botanical Society of America, presiding. Room 214, Campbell Science Hall.

46. What Is Climax in South Louisiana? (10 min.), WILLIS A. EGGLER, Newcomb College of Tulane University.

47. Magnolia Associations in Northern Florida. (10 min.), HERMAN KURZ and KENNETH WAGNER, Florida State University.

48. Studies in the Gothic Natural Area: I. General Considerations. (12 min.), HERBERT A. McCULLOUGH, Howard College and Rocky Mountain Biological Laboratory.

49. A Recent Historical Factor in the Determination of Forest Composition. (12 min.), FRANK W. WOODS, University of Tennessee.

50. Forest Composition and Species Association in the Beech-Maple Forest Region of Western Ohio. (12 min.), ROYAL E. SHANKS, University of Tennessee.

51. Some Problems in the Population Ecology of the Mourning Dove in Georgia. (10 min.), EUGENE P. ODUM, MILTON N. HOPKINS and TERRY A. McGOWAN. University of Georgia and Georgia Game and Fish Commission.

52. The White-tailed Deer in Georgia. (10 min.), JAMES H. JENKINS, University of Georgia.

9:00-12:00 m. Section II. Presentation of Papers. Dr. Arthur L. Cohen, Vice-president of the Georgia Academy of Science, presiding. Room 207, Campbell Science Hall.

53. Mechanism of X-ray Effects in the Production of Chromosomal Aberrations. (10 min.), A. V. BEATTY, Emory University.

54. Fragment Behavior in *Tradescantia hirsuticaulis*. (10 min.), J. M. GOOD, JR., Emory University.

55. The Structure and Division of the Nucleus in *Plasmodium vivax*. (12 min.), GORDON B. WOLCOTT, National Institutes of Health, U. S. Public Health Service.

56. Exo-erythrocytic Stages of *Plasmodium falciparum*. (12 min.), G. M. JEFFREY, G. B. WOLCOTT, M. D. YOUNG and D. C. WILLIAMS, JR., National Institutes of Health, Public Health Service, Federal Security Agency.

57. Recent Developments in the Non-Living Non-Bacterial Culture of *Paramecium aurelia*. (10 min.), WM. D. BURBANCK and MADELINE P. BURBANCK, Emory University.

58. Some Effects of X-radiation on *Paramecium bursaria* and its Symbiotic Algae. (10 min.), JEANNE W. BEATTY, Emory University.

59. Depth Dose Relation for Biological Materials Exposed to Beta Rays. (10 min.), E. B. DARDEN, JR., and C. W. SHEPPARD, Biology Division, Oak Ridge National Laboratory.

60. Effects of Beta Rays and X-rays on Mitotic Rate of Living Grasshopper Neuroblasts. (12 min.), MARY ESTHER GAULDEN, MARJORIE NIX and E. B. DARDEN, JR., Biology Division, Oak Ridge National Laboratory.

61. Fragmentation of Chromosomes in Grasshopper Neuroblasts by Beta Rays and X-rays. (12 min.), MARY ESTHER GAULDEN, KATHERINE LOEMKER and E. D. DARDEN, JR., Biology Division, Oak Ridge National Laboratory.

62. A Cytological Technique for the Study of the Genetic Fungus *Glomerella cingulata*. (10 min.), CHARLES H. DRIVER, Emory University.

63. Genetic and Physiological Factors Controlling Sexual and Asexual Reproduction in Glomerella. (12 min.), H. E. WHEELER, Louisiana State University.

64. The Utilization of Purines, Pyrimidines and Related Compounds by Neurospora. (10 min.), FREDERICK T. WOLF, Vandervile University.

65. Deficiency-Duplications from a Chromosome Translocation in Cotton. (10 min.), MARGARET Y. MENZEL and META S. BROWN, Texas Agricultural Experiment Station.

66. Some Aspects of the Role of the Adrenal Cortex in Relation to the Alarm Response in the Rat. (10 min.), ELMER E. HAGUE, University of Georgia.

67. Histological Technique—A Kodachrome Film. (12 min.), JAMES A. MILLER, JR., Emory University.

Officers of the Association of Southeastern Biologists

Vice-President——H. P. Sturdivant, Western Maryland College

President-Elect——Margaret Hess, Winthrop College

Secretary-Treasurer——A. V. Beatty, Emory University

Executive Committee: D. M. Brown, East Tennessee State Teachers College; B. D. Reynolds, University of Virginia; E. C. Cocke, Wake Forest College; Thelma Howell, Wesleyan College; Josephine Bridgman, Agnes Scott College; R. E. Shanks, University of Tennessee.

Officers of the Southeastern Section. Botanical Society of America

Chairman——Walter S. Flory, Blandy Experimental Farm

Secretary——Robert B. Platt, Emory University

Activities Committee: E. M. Betts, Chairman, University of Virginia; Bert C. Williams, University of Alabama; Wilbur Duncan, University of Georgia.

Officers of the Southern Appalachian Botanical Club

President——William B. Fox, North Carolina State College

Vice-President——Wilbur Duncan, University of Georgia

Treasurer——Nelle Ammons, West Virginia University

Secretary——Elizabeth Ann Bartholomew, West Virginia University

Editor of "Castanea"——E. L. Core, West Virginia University

Officers of the Georgia Academy of Science

Vice-President——Arthur S. Cohen, Oglethorpe University

Secretary-Treasurer——A. S. Edwards, University of Georgia

Historian——W. B. Baker, Emory University

Chairman, Biology Section——Clyde E. Keeler, Georgia State College for Women

Committee on Local Arrangements

Josephine Bridgman, Chairman; Emily Dexter, W. J. Frierson, Nancy Groseclose, Mary Stuart MacDougall

AFTERNOON SESSION 2:30-4:30

Some Geographic Aspects of Arterial Indian Paths Across the Piedmont

JOHN H. GOFF and M. T. THOMSON, School of Business Administration, Emory University

The Piedmont region in primitive days was not a trackless wilderness. Documentary evidence and tradition show that the area was once well threaded with aboriginal trails. Mostly these paths were for local use by the Indians, but some of the thoroughfares were arterial in nature and followed courses that sometimes ran hundreds of miles.

In Georgia, the Augusta area was the focal point for these major routes. The two most important trails which radiated from that section were (1) the Upper Trading Path which led westward across the Piedmont Upland to the Creek Indian settlements on the Chattahoochee, Tallapoosa and Coosa Rivers; and (2) the Lower Trading Path which traversed the Upper Fall Line Hills and skirted the lower side of the Fall Line Belt to reach the same general destinations. At the Coosa both ways connected with routes that led to the Gulf and the Mississippi.

These trails were first used by white traders some 250 years ago. The two paths left Augusta on the same route, but diverged east of today's town of Dearing to follow roughly paralleling courses that ranged from 30 to 55 miles apart. Numbers of crossovers linked the two trails, leading one to believe that first one path and then the other was used depending on soil and weather conditions.

Both trails eventually developed into important white thoroughfares. The Lower Path became the first vehicular route of west Georgia, but it proved too sandy and in time virtually disappeared. The path across the Piedmont became a noted emigrant and stage route. Eventually it too lost arterial significance, although much of it remains as segments of present-day roads.

The courses of these early main trails were remarkably direct. On the many streams that had to be crossed, Providence seems to have provided good fording sites at spots which would facilitate this directness. The paths took skillful advantage of physical features in following the best routes. They favored watersheds and south slopes, but generally avoided high ridges and low areas.

15 Minutes.

The Differential Thermal Analysis of Some Paleozoic Shales in Northwest Georgia

ROBERT W. DARLING, Emory University

(Introduced by J. G. Lester)

The principles of differential thermal analysis were applied to the stratigraphic correlation of sediments. Shales were selected because their high clay content renders them convenient for this type of analysis.

Curves were plotted for each sample to determine stratigraphic

analogies on anomalies. Additional curves were examined in order to determine whether similarities or differences persisted horizontally. The results of this investigation are presented.

15 Minutes. 3 x 4 Slides.

Evidences of Recent Stream Capture near Lithonia, Georgia

E. M. BARGE, Emory University

(Introduced by J. G. Lester)

Tributaries of the South River in the vicinity of Lithonia, Georgia, appear to have captured a former west-east drainage system. This system apparently was consequent on a 900 ft. peneplain which sloped to the southeast across the resistant belt of granites trending north-south from Rock Chapel to Mt. Arabia. Further regional uplift has rejuvenated the South River, lengthening its headwaters at the expense of the temporarily base-leveled west-east consequent system. Numerous elbows and beheaded channels remain as evidence. A description of these channel deposits is given.

10 Minutes. 3 x 4 Slide.

Georgia's Rivers

M. T. THOMSON, U. S. Geological Survey

The fundamental characteristics of Georgia's rivers, by hydrologic regions, in terms suitable to high school teaching are discussed. The basic problems of river control and utilization and the relationships between water resources, conservation, water supply, sanitation, power, navigation, and flood-control are described.

20 Minutes. 3 x 4 Slides.

Structural Investigations in the Cartersville-Whitestone Fault Area, Rockmart, Georgia

R. G. PRUITT and C. D. JUHAN, Emory University

(Introduced by J. G. Lester)

An interpretation of the structure in the Rockmart, Talledaga, and Ashland formations in NW Paulding and SE Polk counties, near Rockmart, Georgia is presented. A map of the area was prepared in which heretofore unmapped outcrops are shown. Several cross sectional views of the "fault-zone" and joint patterns and trends of the area plotted on an overlay sheet are interpreted from data gathered in the field over a period of 6 weeks by a party of 5 students. Photographs of all the indicative features are in color.

20 Minutes. 2 x 2 Color Slides.

Ecological Significance of a Mississippian Blastoid

A. T. ALLEN and J. G. LESTER, Emory University

The ecological significance of a new species of blastoid, *Pentremites gianteus*, is considered as related to a part of the Mississippian section in Catoosa County, Georgia.

15 Minutes. 3 x 4 Slides.

PHILOSOPHY OF SCIENCE SECTION

Chairman: Rubin Gotesky

FRIDAY MORNING, 9:00 A. M.

The Philosophy of the Sciences

PAUL E. PFUETZE, University of Georgia

Philosophers have always been interested in the sciences, as they have been concerned with the other major areas of human activity; and they have felt a certain responsibility to investigate its nature, basic concepts, methods, presuppositions, and implications for the same reason that they have considered it a part of their task to examine, criticize, evaluate, and interpret art, morality, religion, history, and human culture generally. Certain problems and investigations emerge which are "philosophical" in spirit and method but which have their rise in the various sciences.

These problems in the philosophy of the sciences may be roughly grouped into three fairly well marked fields: (1) Problems related directly or indirectly to a consideration of the methods of science; (2) Problems related more directly to subject-matter than to procedures, and involving what may be termed "metaphysical" considerations, i.e., they have to do with the analysis and criticism of the basic terms, concepts, and presuppositions of the sciences; (3) A miscellaneous group of problems dealing with the implications which science has, either in its content, methods or conclusions, for the other aspects of man's life.

Examples illustrating each of these three fields are cited and briefly discussed. In conclusion, brief reference is made to the direction in which future developments may be expected to go.

20 Minutes.

Scientific Relationship

H. W. STRALEY, III, Georgia Institute of Technology

Relations among the sciences may be viewed from either of two standpoints: (1) that the various sciences are equal, sovereign, and separate; or (2) that they are neither equal nor sovereign. According to the second, some are dependent upon others and to different degrees. Granted some means of communication, the sciences may be divided into four orders of dependence, from which arise an equal number of corollaries: (1) a worker in a science with a high order of dependence requires a broader preparation than if he were in one with a low order; (2) as a science advances from description to analysis and synthesis, its workers require a

different preparation; (3) the higher the order of dependence of a science, the more complex its problems; and (4) the definition of a borderline field becomes altered.

15 Minutes. Blackboard.

Mathematics and Experience

TOMLINSON FORT, University of Georgia

This paper reviews some of the classical definitions of mathematics, accepting for purposes of the present a definition of Professor C. I. Lewis of Harvard. This definition leads to a more detailed analysis of logical systems in general. Following this, the topic of isomorphism between systems is discussed and in particular isomorphism between abstract logical systems and physical systems. It is pointed out that the application of mathematics to physics is essentially a matter of isomorphism and that the confidence that we have in results thus obtained is amply borne out by experiment. The kind of mathematical system that can be isomorphic to a physical system is considered. Following this, the rule of approximate isomorphism is discussed. The whole thing leads to a brief discussion of the nature of the physical world and man's efforts to study it.

20 Minutes.

Scientific Rules and Criteria: Methodological, Technical and Device

RUBIN GOTESKY, University of Georgia

Beginning with a discussion of the well recognized fact of disagreement about the nature and methods of science, this paper turns to an analysis of three kinds of scientific principles—principles being defined as either rules of procedures (operational rules) or criteria for judging results obtained—methodological, technical and device.

Methodological principles are those which are used by all sciences; technical, those peculiar to a particular science; and device, those specifically useful for the solving of a particular kind of problem. Three orders or levels of such principles are discussed.

In conclusion, it is suggested that careful investigation of scientific practice in terms of the above distinctions may lead to greater agreement among writers about science as to its constitutive nature.

20 Minutes.

General Principles Applied to the Determination of Biological Form

ARTHUR L. COHEN, Oglethorpe University, Georgia

Although a number of workers have developed concepts of a general nature concerning biological phenomena, there has been

very little done in applying these principles to observed phenomena. Thus there is a wide gulf between the experimental biologists and the theoretical biologists. The present paper is an attempt to show how certain principles may be put to use in clarifying problems of morphogenesis. Among these are Sommerhoff's ideas concerning the coenetic variable and the focal condition, and the author's concepts of autauxic complexity critical boundaries.

Some of the author's experiments in which an attempt is made to apply these concepts are described.

20 Minutes.

Archaeology and the Sciences

A. R. KELLY, University of Georgia

The relationship of archaeology to the sciences has become increasingly more complex in recent years. The purpose of archaeology, to reconstruct the past life of man, allies it more immediately to the broad scope of history.

The methods of archaeology more closely assimilate it to the natural sciences. The archaeologist must identify objects and structures in context, and in both instances he draws upon correlated studies in almost every major field of natural and biological science.

Geochronology utilizes palaeontology, geology, astronomy, climatology. An absolute chronology has been worked out for the Pleistocene on astronomical calculations, correlated with relative chronology of archaeological remains found in glacial deposits, terraces, raised beaches, loess, solifluction deposits, peat bogs. Pollenanalysis as a clue to ancient climates in connection with raised beaches has almost pin-pointed cultural remains in the Baltic region.

Recently chemical means of dating the past have been developed. The determination of the fluorine content of fossil bones relative to the soil, by spectographic and microchemical analysis, has figured in attempts to date the oldest finds of neanthropic man in Europe. Soil chemistry, correlated with geomorphology, is being applied by V. P. Sokoloff and George F. Carter of Johns Hopkins University in studying raised beaches, "senile soils," and paleoclimatology on reputed early man sites in the United States.

Most highly publicized of recent methods is the determination of the content of radioactive carbon present in wood, shell, bone, peat taken from archaeological horizons. Precedural difficulties, both in taking the samples and in laboratory analysis, have raised doubts, but the method is undergoing refinement and may ultimately give calculated dates back to 30,000 years.

15 Minutes.

Fundamental Laws of Geology

A. T. NAVARRE and H. W. STRALEY, III,
Georgia Institute of Technology

If the various sciences are neither equal nor sovereign, but dependent upon one another in different degrees, geology may be classified as a science of the Third Order of Dependence (Straley, Scientific Relationship, Georgia Academy Science, 1952).

Accepting this conclusion, one may erect a firm foundation of basic laws of geology using as building blocks the fundamental tenets of physics, astronomy, and chemistry. The paleontological wing must have its roots planted on such biological principles as are applicable to a study of ancient life. The blocks used in the superstructure are laws of less general application, restricted in utility to the sciences pertaining particularly to the earth. The mortar binding the whole together is a long list of special cases of more fundamental principles, that apply solely to the geological framework.

15 Minutes.

On Criteria for Fitting Mathematical Models to Experimental Data

A. C. COHEN, JR., The University of Georgia

When a mathematical model is 'fitted' to experimental data, the problem is to decide whether the fit is satisfactory and whether the model selected gives the 'best' fit according to certain criteria. Classical methods for dealing with this problem include the least square technique and the principle of maximum likelihood. In many instances, however, these standard classical approaches lead to fits which though 'best' according to the criteria adopted, are nevertheless unsatisfactory. This difficulty stems from the more fundamental question of what criteria to employ in defining what is meant by the 'best' fit. The present paper represents an attempt to examine some of the considerations involved in answering this question.

15 Minutes.

PSYCHOLOGY, BIOLOGY AND MEDICINE SECTION

Chairman: Emily Dexter

FRIDAY AFTERNOON: 2:30

Pathways in a Cerebral Palsy Brain

EMILY BARRY WALKER, Anatomy Department,
Emory University School of Dentistry

This paper is based on a continuation of the study of the paraplegic colored boy whose case was presented last year.

The brain gave definite evidence of the spastic condition of the limbs and a further study of the brain has added additional light on the character and extent of the brain injury.

A review of the parts of the brain contrasting the normal with the abnormal seemed helpful and the extent of the fibers in the central white commissure, the corpus callosum seemed significant.

By means of sections of the medulla a brief study was made of the decussation df the fibers in the pyramids. A study in detail of this might give a clue as to the age at which the brain injury took place.

15 Minutes.

Multiple Discrimination and Patterned String Performance in Normal and Brain-Injured Monkeys

R. G. ALPER, P. N. STRONG, A. J. RIOPELLE, H. W. ADES,
Dept. of Psychology, Emory University

(Introduced by Dr. M. C. Langhorne)

Four normal monkeys and four monkeys subjected to deep bilateral lesions of the temporal lobes were tested on samples of two classes of visually guided behavior All animals were first trained to discriminate between the members of successive pairs of stimulus objects for food reward. Each problem was presented for six trials and six problems were presented each day. The first five problems of any day were new to the animals but on the sixth problem either the first or fourth problem of that day was reintroduced but with reversed reward. The animals were tested for 63 days involving a total of 315 new and 63 old-reversed problems. A non-correction procedure was used throughout. Normal animals showed continued improvement in the rate of learning new problems, indicating the formation of learning sets. The brain damaged animals failed to show this improvement with practice on the reversed problems, the normal animals showed similar improvement despite initial transfer. The brain-damaged animals again showed no improvement.

The second sample, patterned string problems, required the monkeys to select a food-baited chain from a number of chains arranged in varying geometric patterns. Six patterns of varying difficulty were presented sequentially until the animals attained a criterian of 20/25 correct choices, provided criterion was reached in 150 trials. Little or no loss of performance was noted in the brain-damaged monkeys.

The result indicates that bilateral lesions of the temporal lobes selectively affect various aspects of visually guided behavior.

15 Minutes.

The Reliability of a Three Dimensional Steadiness Apparatus

J. STANLEY GRAY and GEORGE SUSTARE, University of Georgia

An apparatus was constructed to measure operational steadiness in three dimensions. It consists of seven feet of one-fourth inch copper tubing bent in all three planes, a five-eighth inch ring welded to a handle, a transformer, and an electric counter. The test consists of passing the stylus-ring along the tubing in the least time with the least number of contacts. After a practice run, the time and contacts for two runs are recorded. Standard scores were calculated from 400 cases.

The reliability, as indicated by a correlation between run one and run two, is .83 $\pm$.002. Factors affecting steadiness are now being studied. Preliminary data will be reported regarding sex differences, the effect of smoking, the relation to finger tremor, and the relation to occupational skill.

15 Minutes.

Auditory and Visual Depth Perception

AUSTIN S. EDWARDS, The University of Georgia

This is essentially a progress report on a series of experiments upon accuracy of depth perception.

So far as the writer knows, no previous report has ever been made upon measurements of auditory depth perception. An experiment has been made in which standard distances were used for the sounds of a single metronome which was moved nearer and farther from the subjects. Measurements of the accuracy of depth perception were taken in centimeters.

Several series of experiments are under way in visual depth perception with special interest in differences of illumination, and of discovering methods by means of which one-eyed subjects might be trained to more accurate depth perception. Results so far at least suggest that perhaps 20 per cent of subjects can judge more accurately with comparatively small amounts of illumination. Our results in depth perception seem to offer agreement with the recent findings of Miles Tinker on visual acuity and illumination in reading.

10 Minutes.

Oxidation-Reduction Potential Studies on Mycobacteria

W. B. REDMOND, Tuberculosis Research Laboratory, Veterans Administration Hospital, Chamblee, Georgia

A culture flask has been designed for use in determining the ORP of a culture of pathogenic bacteria without opening the culture. Using this flask it is possible to make determination on cultures of *Mycobacterium tuberculosis* daily for a period of several weeks. It has been found that the potential of the pathogenic human tubercle bacillus is much higher at the growth peak than for certain non-pathogenic trains. Work is being done on the effect of the ORP of certain reducing substances and the effect of these substances, either directly or indirectly, on the development and growth of the organisms.

15 Minutes. Lantern Slides.

Total and Acid-Soluble Fraction of Phosphorus in Various Tissues of Chick Embryos

MARY HANSON PARTRIDGE and MARY ELIZABETH SHONTZ, Department of Anatomy, Emory University, Georgia

(Introduced by Josel Szepsenwol)

Total tissue phosphorus and acid-soluble phosphorus fractions were determined in brain, heart, liver, smooth muscle, chorio-allantoic membrane, and skeletal muscle of chick embryos throughout development. Acid-soluble phosphate usually varies from 20 to 25% of the total in all the tissues. In skeletal muscle it increases to 40% two days before hatching.

In brain, acid-soluble phosphate increases slightly during the

last days of incubation. Acid-soluble phosphate of the heart increases gradually from the 9th to the 19th day of incubation, due to a rise in inorganic phosphate. In the liver, acid-soluble phosphate changes only slightly up to the 20th day, when it abruptly decreases. Smooth muscle digestive tract shows little variation in acid-soluble phosphate. An increase in the inorganic fraction between the 11th and 18th days is compensated by a decrease in the organic fractions. In the chorio-allantoic membrane the acid-soluble phosphate increases progressively from the 8th to the 15th day of incubation, decreasing thereafter, due chiefly to changes in the inorganic and hexose phosphate fractions. In all tissues an increase in ATP is accompanied by a decrease in phosphocreatine, and vice versa.

The most striking changes occur in skeletal muscle, where the acid-soluble phosphate abruptly increases between the 12th and 18th days of incubation. This increase is due chiefly to inorganic phosphate, in part to hexose phosphate.

15 Minutes.

MATHEMATICS, PHYSICS AND ASTRONOMY SECTION

Chairman: R. J. Levit

FRIDAY 2:30 P. M.

Photoelectric Observations of Lambda Andromedae

W. A. CALDER, Agnes Scott College

(Introduced by Henry A. Robinson)

A grant from the Research Corporation has made possible the construction of a photoelectric emplifier for use with the 30″ Beck Telescope of Bradley Observatory. Observations of Lambda Andromedae were made on every clear night over a period of four months during the winter of 1950-51, but these were not reduced until the following summer.

Lambda Andromedae is a spectroscopic binary with a period of 20.52 days. Because of its being suspected of variation, the author had previously made several series of observations of the star which indicated than one component is a cepheid variable. Because of the presence of two stars which are unresolvable, the amplitude of variation is reduced to about a third of a magnitude. The present series of observations extends the period of examination to 116 cycles and leads to a period of 53.696 days for the cepheid variation.

6 Minutes.

Demonstration Model of Eclipsing Binary Star System

W. A. CALDER, Agnes Scott College

Eclipsing double star systems, observed photoelectrically, furnish the best source of information concerning physical properties of stars. While the complete solution of a light curve is extra-

ordinarily complex (involving 17 unknowns), rough data regarding relative total and surface brightnesses, and relative diameters of stars in terms of the orbital size can be found with simple arithmetic.

An artificial binary star system consisting of two 7-watt bulbs and driven by a Telechron motor produces eclipses with a wide range of parameters, with considerable realism. Observations are made with a telescope 150 feet from the star system. The output of a 931 A Photomultiplier is fed into an amplifier which drives three microammeters in series. Three pairs of students are enabled to work simultaneously on the first really new laboratory exercise of astronomy in recent years.

15 Minutes.

Note:

A HOME-MADE PLANETARIUM

W. A. CALDER, Agnes Scott College

An inexpensive projector which simulates the sky with stars, planets and Milky Way will be demonstrated during the Open House at Bradley Observatory on Friday night, April 18.

An Opical Pyrometer for the Infra-Red Spectrum

THOS. A. BARR, JR., Vanderbilt University
(now at University of Georgia)

(Introduced by E. H. Dixon)

An optical pyrometer has been made which uses a 1P25A Infrared Image Tube as a viewing device. This tube enables one to "see" black body radiators which have temperatures of from 450°C to 650°C. The pyrometer is composed of three main sections; first, the image tube, optical system, and electronic focusing control, second, the standardized lamp and its associated equipment, and third, the power supply.

A description of the image tube will be given along with the description of the pyrometer and its uses.

15 Minutes. Standard Slides.

The Fine Structure of the Microwave Structure of Oxygen

J. H. BURKHALTER, Physics Department, University of Georgia

(Introduced by E. H. Dixon)

The microwave absorption spectrum of oxygen in the region of 5 mm. wavelength has been measured at low pressure by means of a Zeeman modulation microwave spectroscope. At the pressures used the lines were completely resolved. Precise measurement of the frequencies are made, and uniform deviations from the theoretical frequencies predicted by Schlapp were found. The line width parameter is measured for selected lines and found to vary with the rotational state.

15 Minutes. Standard Slides.

On the Definition of Polynomial

GERALD B. HUFF, The University of Georgia

While everyone is agreed on the rules for operating with polynomials in an indeterminate x, with coefficient in a ring; there is no such unanimity as to the most efficient and rigorous way to introduce the concept. This paper suggests the following approach. Let R be a commutative ring with identity and suppose that the elementary algebra of matrices with elements in R has been developed. Let S be the set of square matrices such that all elements along any file parallel to the main diagonal are equal and all elements below the main diagonal are zero. Let two matrices A and B of S be equivalent if every non-zero element in the first row of A is equal to the corresponding element in the first row of B and conversely. This relation partitions S into equivalence classes. The key definition is: An equivalence class of S is called a polynomial. Then addition and multiplication may be defined in a natural way and the ring properties of polynomials follow immediately from the same properties for matrices. One curious result is that Sylvester's determinant appears in an especially simple way in this approach.

20 Minutes.

On the Convergence of Approximate Solutions of the Vibrating Membrane Equation to the Exact Solution

ALFRED HIND, University of Georgia

(Introduced by Professor R. J. Levit)

The well known boundary value problem for a vibrating square membrane has a discrete analogue in which the partial differential equation is replaced by a partial difference equation. It is shown that the solution of the continuous problem can be obtained as a limit of properly chosen solutions of the discrete problem.

20 Minutes.

Application of the Minimax Criterion for Best Approximation

R. J. LEVIT, University of Georgia

In place of the least squares criterion for best approximation, it is sometimes advisable to use the less familiar minimax criterion defines as follows: Given an ordered set $(a_1, \ldots, a_n)$, that one of a specified class of ordered sets $(x_1, \ldots, x_n)$ for which the largest in absolute value of the differences $x_i - a_i$ is a minimum is called the minimax approximation to $(a_1, \ldots, a_n)$. A method is given for determining the best approximate solution to an inconsistent system of linear equations and for determining that curve of a specified family which fits a given set of empirical data best in the minimax sense.

20 minutes

SPECIAL NOTICE

Changes of Addresses

All members should note carefully that all communications to the secretary, the treasurer and the editor of the Bulletin should conform to the elections announced at the business meeting. There will be three officers to whom communications are to be sent.

The books of the Academy will be audited as of April 1, and all checks for dues sent after that date should be sent to the new treasurer.

All exchange publications should be addressed to the Library of the Georgia Academy of Science, General Library, University of Georgia, Athens, Ga.

V
1
0
A
FL
X

ions
etin
neet-
are

and
the

rary
iver-